Remarks:

Please reconsider the application in view of the foregoing amendments and the following remarks.

1. Status of the Claims

Claims 1-11, 13-16, 18-20, 22-29, and 31-39 are pending in the application. Claims 1, 7, 9, 20, 28 and 32 are independent. Claims 1, 3-11, 13, 14, 16, 19, 20, 23, 24, 26-29, 32-35 and 37-39 stand rejected as obvious over Lew U.S. Patent No. 5,194,809). Claims 2, 15, 22, 31 and 36 stand rejected as obvious over Lew in view of Van Yperen (U.S. Patent No. 5,402,787). Claims 18 and 25 stand rejected as obvious over Lew in view of Mancuso et al. (U.S. Patent No. 4,784,146).

1. Claim rejections - 35 U.S.C. § 103(a)

Claims 1, 3-11, 13, 14, 16, 19, 20, 23, 24, 26-29, 32-35 and 37-39 stand rejected as obvious over Lew U.S. Patent No. 5,194,809). To the extent the rejection may apply to the claims as amended, the Applicant respectfully requests reconsideration.

Claim 1 as amended recites a method for determining composition of a portion of a body. The method according to claim1 includes inducing a substantially homogeneous static magnetic field and a gradient magnetic field in an entire body. The gradient magnetic field is along a selected axis. A radio frequency magnetic field is induced in the entire body while inducing the combined static and gradient magnetic fields. The radio frequency magnetic field has a frequency selected to excite nuclear magnetic resonance phenomena in a portion of the body along the selected direction where the combined amplitudes of the static and gradient fields correspond to the frequency of the RF magnetic field. At least an amplitude of a nuclear magnetic resonance signal is determined. At least one of an amplitude of the static magnetic field and the gradient magnetic field is adjusted, and the inducing the radio frequency magnetic field and determining the amplitude of a nuclear magnetic resonance signal are repeated for another portion of the body along the selected direction (axis). A portion of the body for analysis

is determined from the at least the amplitudes of the nuclear magnetic resonance signals previously determined.

The amplitude of the static magnetic field and the gradient of the gradient magnetic field are then selected to excite nuclear magnetic resonance phenomena in the selected portion of the body. A radio frequency magnetic field is excited in the entire body. Nuclear magnetic resonance signals are detected from the selected body portion and a mass of at least one constituent in the selected body portion is determined from the detected nuclear magnetic resonance signals from the body portion. At least one of displaying and storing the determined mass is performed.

In the Office Action of May 3, 2007, it was asserted that the only difference between what is shown in Lew and what is claimed is imaging a nuclear magnetic resonance property along one direction to localize a volume of investigation for analysis. The Applicant believes that as amended, claim 1 is not so broadly related to the disclosure in Lew. As amended, claim 1 requires that the static magnetic field induced in an entire body is substantially homogeneous and a gradient field is imparted along a selected direction. A radio frequency magnetic field is induced in the entire body, however, NMR phenomena are excited only in a selected body portion along the selected direction depending on the static field amplitude and the distribution of the gradient field. At least an amplitude of an NMR signal is determined. Then either the static magnetic field amplitude is varied or the gradient field is varied to localize NMR excitation within a different selected body portion along the selected direction. The NMR excitation and detection are repeated such that an NMR signal amplitude at least is determined in a different body portion. The NMR signal amplitudes are used to identify a portion of the body to be analyzed.

When the body portion to be analyzed is identified, the static field amplitude and the gradient field are then selected to localize NMR excitation to within the selected body portion. The gradient of the gradient field is selected such that the body portion has a particular size along the axis. NMR signals thus excited in the selected body portion are then used to determine a mass of at least one constituent in the selected body portion.

Claim 1 differs from Lew by more than mere 1-dimensional imaging of an NMR property to localize the body part to be analyzed. Claim 1 requires that the static magnetic field is substantially homogeneous in the entire body and a gradient of the gradient magnetic field is along a selected axis or direction. Thus, the NMR signals acquired from each imaged body portion represent a full cross-section "slice" of the body, from which the amplitude of the NMR signal can be related to composition of the entire cross section of the body transverse to the selected direction. In conventional NMR imaging, the body is segmented along three dimensions, using gradient magnetic fields along three orthogonal directions, and the image is assembled pixel by pixel. The invention of claim 1, by contrast, determines a signal value related to the composition of a full cross-section slice for each selected value of static field amplitude and/or gradient field distribution. By imaging along the selected direction as recited in claim 1, a very quickly generated composition distribution along one direction can be determined so that the analysis can be localized to the selected body portion correspondingly quickly. Using prior art imaging techniques to determine position of a body part for analysis, it is necessary to assemble pixellated images in two dimensions for each image slice. An advantage of a method according to claim 1 is much faster determination of the volume to be analyzed.

By adjusting the gradient of the gradient field in the method of claim 1, the size, along the axis, of the body portion being analyzed is also selected. By increasing the gradient, for a constant bandwidth radio frequency magnetic field, the size along the selected direction of the body portion being analyzed will decrease, and vice versa. This particular feature of the Applicant's claimed method is not disclosed in any of the art of record.

To the extent any imaging is localized in the techniques disclosed in the prior art of record, the image element volume (voxel or pixel size) is fixed because the gradient of any applied gradient magnetic field is fixed. Thus, using prior art techniques, it is not possible to image a volume having selectable size by varying the gradient of the gradient field. A possible advantage of the method of Applicant's claim 1 is that after identifying the portion of the body to be analyzed, the static field amplitude and the gradient can be selected to excite NMR phenomena in the entire

body portion cross section, where the body portion has a selectable size along the axis. The selectable size is related to the bandwidth of the RF magnetic field and receiving circuitry and the gradient of the gradient field. By selecting the size, the body portion may be analyzed all at once from the excited and detected NMR signals.

The Applicant believes that the manner of identifying, localizing and selecting the size along the axis of the body portion to be analyzed, using the one dimensional NMR imaging technique and subsequent gradient selection to select the body portion size set forth in claim 1, is not disclosed or suggested by any of the prior art of record. Thus, the combination of claim 1 is not made obvious by reference to Lew.

Claims 2-6 and new claim 38 ultimately depend from claim 1 and are believed to be patentable for at least the same reasons set forth with respect to claim 1.

Claim 7 recites an apparatus configured to perform the method recited in claim 1. Claim 7 is believed to be patentable for at least the same reasons set forth with respect to claim 1. Claim 8 depends from claim 7 and is believed to be patentable by reason of dependence from a patentable base claim.

Claims 9-37 and 39 have been canceled.

This Reply is believed to be fully responsive to each and every ground of rejection cited in the Office Action of May 3, 2007, and the Applicant respectfully requests early favorable action on this application.

Respectfully submitted,

/Richard A. Fagin/

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Richard A. Fagin, Reg. No. 39,182
P.O. Box 1247
Richmond, TX 77406-1247

Telephone: (713) 539-5006
Facsimile: (832) 595-0133